Lat 40.54844 Lon -121.63091

Forest Health Protection

Pacific Southwest Region

Date: December 9, 2002
File Code: 3420

To: District Ranger, Hat Creek Ranger District, Lassen National Forest

Subject: Evaluation of the Manzanita Chutes/Battle Creek Reservoir Plantation (FHP Report NE02-13)

At the request of Paul White, Forester, Hat Creek RD, I conducted a field evaluation of the Manzanita Chutes/Battle Creek Reservoir plantation on August 5, 2002 and revisited the site with Don Owen, CDF Forest Pest Management Specialist, and Bill Woodruff, FHP Plant Pathologist, on October 15, 2002. The objective of both visits was to identify the cause of shoot and tip dieback that has increased within the plantation over the last couple of years and provide management recommendations as appropriate.

Background

The Manzanita Chutes/Battle Creek Reservoir plantation is located along the 32N17 road, one mile north of Highway 44, at an elevation of 5100 feet (T31N, R3E, Sec 10). The plantation consists of approximately 40-year-old ponderosa pine (*Pinus ponderosa*) associated with a dense understory of manzanita (*Arctostaphylos patula*) and snowbrush (*Ceanothus velutinus*). Trees were planted at 10 x 10 foot spacing and now range from approximately 12 to 30 feet in height. Several openings exist throughout the plantation due to rock outcroppings and past mortality of seedlings growing under intense brush competition. The site is a Dunning 3. The surrounding forested area is occupied by mixed conifer: Jeffrey pine (*Pinus jeffreyi*), ponderosa pine (*Pinus*

NORTHEASTERN CALIFORNIA SHARED SERVICE AREA
2550 RIVERSIDE DRIVE
SUSANVILLE, CA 96130
530-257-2151

Sheri Lee Smith
Supervisory Entomologist
ssmith@fs.fed.us

Danny Cluck
Entomologist
dcluck@fs.fed.us

Bill Woodruff
Plant Pathologist
wwoodruff@fs.fed.us

ponderosa), sugar pine (*Pinus lambertiana*), incense cedar (*Libocedrus decurrens*) and white fir (*Abies concolor*).

Observations

Scattered dieback of lateral shoots was observed in approximately 1/3 of the ponderosa pine growing along the 32N17 road that crosses the western portion of the plantation. These trees are growing under intense competition, as the brush is 6' – 8' tall and impenetrable. Therefore, the extent of shoot dieback in areas away from the road could not be determined. Affected trees exhibited dieback ranging from only a few shoots to more than half the shoots throughout the crown. Removal of the bark revealed that most of the dead and dying twigs had extensive areas inundated with pitch. Old wounds, or possibly cankers, were also observed on branches of affected trees. Extensive examination of shoots during the second visit revealed the characteristic reddish-orange maggots of the gouty pitch midge (*Cecidomyia piniinopis*) (See Appendix A).

Discussion

Gouty pitch midge populations can fluctuate markedly from one year to the next. High population levels persisting for several successive years are generally uncommon due to natural controls, however, in plantations, damaging population levels can remain for up to 7 years. It is impossible to predict whether noticeable damage levels will persist. If damaging population levels continue in the Manzanita Chutes/Battle Creek Res. plantation, shoot dieback will continue to reduce tree health and vigor making affected pines more susceptible to damage from other insects for several years. Heavily infested trees may die, particularly with the continuing competition from brush. Continuing drought conditions may exacerbate these problems.

Conclusion

The best treatment for reducing gouty pitch midge damage in the Manzanita Chutes/Battle Creek Res. plantation would be to remove the brush competition. Brush treatment will not affect gouty pitch midge populations directly, but as the released trees become more vigorous and increase their growth they should be able to "outgrow" the damage. Trees greater than 20 feet tall are less frequently attacked and when attacks do occur, they have less of an impact on health and vigor. An increase in the health and vigor of released trees would also decrease the chances of significant mortality due to other insects such as bark beetles. Relatively few trees, mostly those severely suppressed, appeared affected by midge attacks to the extent that there is a high probability of them dying or that recovery to a more healthy condition would be unlikely.

A preventative treatment would be to select for resistant hosts. Pronounced differences in susceptibility to attack by the gouty pitch midge have been observed between individual ponderosa pine trees. The differences are related to the nature of the surface of the spring shoots. Three surface types have been recognized: smooth and dry (glabrous), waxy (glaucous) or sticky and resinous (viscid). The latter, which comprised about one-third of the trees in the stands studied, are more susceptible to attack by the midge than either the smooth or the waxy types. This characteristic (sticky, resinous shoots) should be utilized as an additional tree selection criterion during commercial and pre-commercial thinnings. It may also be a consideration in the

selection of ponderosa pine seed trees and the selection of planting stock.

Forest Health Protection can assist with the funding for thinning and removal of material from overstocked plantations to increase tree growth and vigor. If you are interested in this funding please contact any of the Forest Health Protection entomology staff for assistance in developing and submitting a proposal.

If you have any questions regarding this report and/or need additional information please contact me at 530-252-6431 or at dcluck@fs.fed.us.

Daniel R. Cluck
Entomologist
Forest Health Protection
NE CA Shared Service Area

Appendix A – Gouty Pitch Midge Biology

The gouty pitch midge has a transcontinental distribution. In the west, its hosts are ponderosa and Jeffrey pine. Adults are active in the spring (March – May) and lay their eggs on the tips of expanding branches and leaders. After hatching, the larvae bore through the surface of the shoot and hollow out a cavity or pit within the vascular tissue. There, surrounded by fluid resin, which fills the cavity or pit, they feed over the winter. In the spring, the larvae leave the feeding pit and crawl onto the needles where they pupate in characteristic white cocoons. These cocoons frequently remain on the needle after the next generation adults have emerged. There is one generation per year.

Gouty pitch midge populations often fluctuate markedly from year to year. Damaging population levels do not usually occur in a given area for more than 2 –3 successive years, although they may be somewhat more persistent in plantations (up to 7 years). Pitch midge attacks/damage are not necessarily distributed uniformly throughout infested stands/plantations. Their patchy distribution may be due in part, at least in ponderosa pine plantations, to differences in host susceptibility. Saplings and poles up to 15 – 20 feet are usually the most heavily attacked, trees under 3 years of age rarely suffer damage, and older, taller trees are attacked primarily in the lower crown. There is some evidence that gouty pitch midge damage in plantations increases with the amount of brush present. Although the number of pitch midge attacks may not differ between plantations with relatively greater and lesser amounts of brush, trees under stress from brush competition are probably affected more severely and recover more slowly from pitch midge attacks than more vigorous, healthy trees.

Gouty pitch midge attacks typically do not cause extensive mortality. The mortality that does occur is usually associated with weakened and suppressed trees. The most common damage caused by the midge is the killing of branch and leader terminals resulting in deformity and growth loss. Effects are most pronounced when the trees are attacked in successive years. Growth loss and distortion may predispose trees to attack by other insects and potentially increase rotation length. However, the effects of such damage have not been evaluated over either the short or long term (rotation), and it is difficult to conclusively assess or predict pitch midge impact on pine plantation management.